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An overview of Factors Associated with Low Immunization Coverage in Nigeria

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Abstract

The launch of Expanded Program on Immunization (EPI) has thoroughly proven to reduce the incidence of vaccine preventable diseases. Improving immunization coverage is vital to promoting child health and reducing childhood diseases and deaths. The present study was undertaken to evaluate the immunization coverage and identify factors affecting children's immunization coverage in the country. Data generated from the 2016/2017 Multiple Indicator Cluster Survey (MICS) and National Immunization Coverage Survey (NICS) was used. A multi-stage, stratified cluster sampling approach was adopted for sample selection. The surveys were designed to provide estimates of vaccination coverage for the country. Study population covered children aged 12–23 months. The highest percentage of children vaccinated were seen in South East (66%) and South West (66%), closely followed by South-South (65%). Results from the Northern part of the country were comparatively lower than what obtains in the southern part, with 39%, 28% and 14% for North-Central, North-East and North-West respectively. North West (14%) was the least performing zone when compared with other zones in the region. There was no gender difference as per children vaccinated. Those vaccinated in the urban areas (51%) were more than those in the rural areas (25%). Reasons such as lack of knowledge about vaccines and vaccination services, lack of time, mistrust or fears, service delivery issues and illness of the child were advanced by caregivers for non-vaccination of children. From the study it was seen that children of parents/care givers with tertiary educational level were more likely to be vaccinated (43.8%) than children of parents/care givers with primary educational levels (22.5%). This study showed the need to strengthen immunization system in the northern part of the country, which may require systematic strategies to reduce or eliminate the huge vaccination gap that exists between the two regions.

Key words: Children, Coverage, Immunization, Factors, Nigeria, Survey.

Introduction

It has been observed that, vaccine preventable diseases account for nearly 20% of all deaths occurring annually amongst children under five years of age worldwide (WHO, 2012). From a survey done, it was estimated that the under-5 mortality rate to be 117 per 1,000 live births (UNICEF, 2015). This led to in 2005, for the two major United Nation's bodies to develop the Global

Immunization Vision and Strategy (GIVS), with the aim of reducing vaccine-preventable disease (WHO and UNICEF, 2005). Since the launch of the Expanded Program on Immunization (EPI) by WHO, the effectiveness of immunization has been thoroughly proven to reduce the incidence of vaccine preventable diseases (Singh, 2013). The programme has been acclaimed worldwide as a highly cost-effective lifesaver (Bbaale, 2015).

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Nigeria's poor child health indices, for instance high infant mortality as reported by Musa *et al.* (2015) are reportedly associated with low immunization coverage, which is amongst the lowest worldwide (Ophori *et al.*, 2014; Olorunsaiye and Degge, 2016). The main cause was related to poor utilization of health services (Antai, 2011; NPC, 2014). Which factors such as level of literacy rate could affect, for example strong correlation has been established between female literacy rate and child immunization status (Davis and Kalu-Nwivu, 2001).

Improving immunization coverage is vital to promoting child health and reducing childhood diseases and death. Poor knowledge about immunization, lack of suitable venues, financial difficulties, long waiting times, transport difficulties, timing of immunization sessions, attitude of service providers, fear of side-effects, poorly motivated service providers and weak intersectoral collaboration have been identified as some of the many challenges facing the programme in developing countries (Adokiya *et al.*, 2017).

The present study was undertaken to evaluate and compare northern and southern part of Nigeria in respect to immunization coverage, identify factors affecting children's immunization coverage and proper possible solutions to those challenges.

Materials and Methods

Study area

Nigeria is located in West Africa, it had an estimated population of over 184 million as at December 2017 (NPC, 2017). The country is made up of 36 states and the Federal Capital Territory (FCT).

Study design

We used data generated from the 2016/2017 Multiple Indicator Cluster Survey (MICS) and National Immunization Coverage Survey (NICS) coordinated and conducted by the National Bureau of Statistics in collaboration with World Health Organization, UNICEF, Bill and Melinda Gates foundation. Briefly, the procedure was as follows: A multi-stage, stratified cluster sampling approach was used for the selection of the survey sample. Surveys of this nature were designed to provide estimates of vaccination coverage for the country (Nath *et al.*, 2007), disaggregated by zones and states plus FCT. The states within each zone were identified as the main sampling strata while enumeration areas (EAs) within each state were identified as the main sampling units.

Sampling frame

The survey uses the national sampling frame, which is a list of Enumeration Areas (EAs) prepared from the 2006 Population Census. Sixty core EAs in every state were selected while Kano & Lagos had 120 EAs. Sixteen households per EA were selected.

Approximately 37,440 households were visited and sampled. The study population covered children aged 12–23 months, which was in line with WHO-EPI recommendation. For the purpose of this publication only data collected from questionnaire for children under 5 years was used.

Statistical analysis

Results were analysed using the Epi Info Statistical Package version 3.5.4 July 30 2012 software package. The significance of the values obtained was determined at $P < 0.05$

Ethical considerations

Approval for the study was given by the National Primary Health Care Development Agency.

Results

The highest number vaccinated was seen in South East and South West closely followed by South-South. Results from the Northern part of the country ranged from 39% to 14% as compared with 66% to 65% in the southern part. North West (14%) was the least performing zone when compared with other zones in the region, this is shown in Table 1.

Table 1: Percentage of children 12 - 23 months with any evidence of vaccination with pentavalent vaccine in the country

S/N	Zone	% vaccination coverage	P value
1	North-Central	39	0.0001
2	North-East	28	
3	North-West	14	
4	South-South	65	
5	South-East	66	
6	South-West	66	

The difference between the percentages of male and female children vaccinated during the survey was conducted was not statistically significant at ($P < 0.05$). The percentage of females vaccinated (34%) was however slightly higher than that of males vaccinated (34%) as shown in Figure 1.

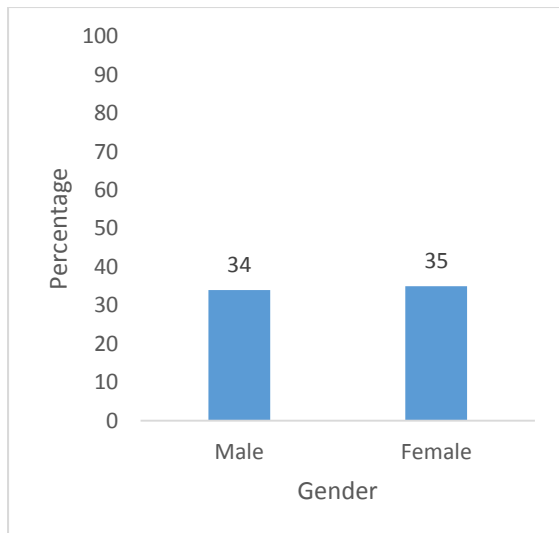


Figure 1: Percentage Distribution of Vaccinated Children by Gender amongst the Sampled

The percentage of the vaccinated children in the urban areas was more than the children vaccinated in the rural areas amongst the children sampled, the difference was statistically significant at $P < 0.005$. About 51% of those vaccinated were in the urban areas while the remaining children were vaccinated from the rural areas, this is shown in Figure 2 below.

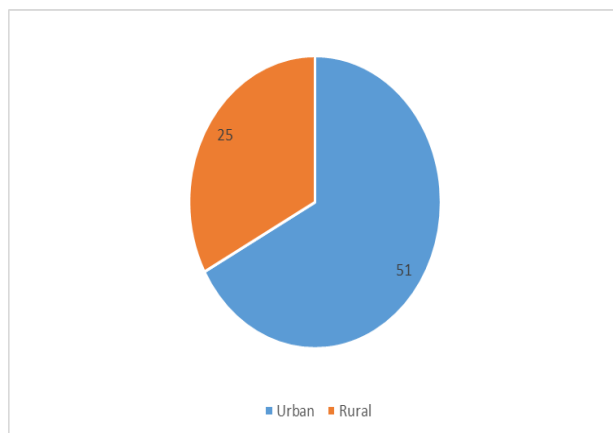


Figure 2: Percentage Distribution of Vaccinated Children Living in Urban and Rural Areas Sampled

Different reasons were advanced by parents and caregivers for non-vaccination of their children or wards. Those lacking knowledge about immunization were higher than any other group. Parents/Caregivers whose reason of non-vaccination was illness of the child were the least followed by those not having time to take their children to immunization points as shown in Figure 3. However these differences were not statistically significant at 0.05

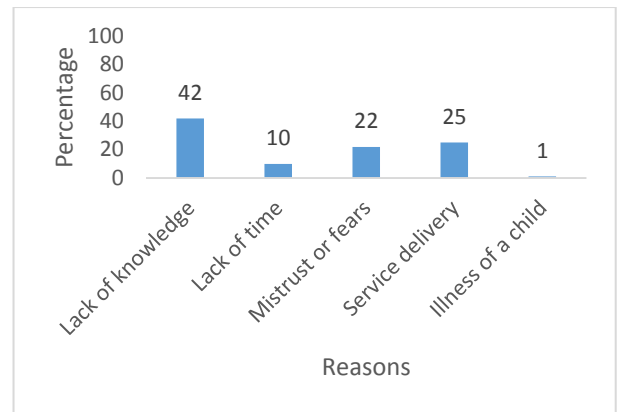


Figure 3: Reasons for Non-Vaccination Advanced by Parents/Caregivers of Children Sampled During the Survey

Percentage of children vaccinated based on the perceived influence of the Mother's/Caregiver's educational level is shown in Figure 4. Parents/Caregivers with higher educational level were observed to avail their children/wards for vaccination more than those with lower educational levels.

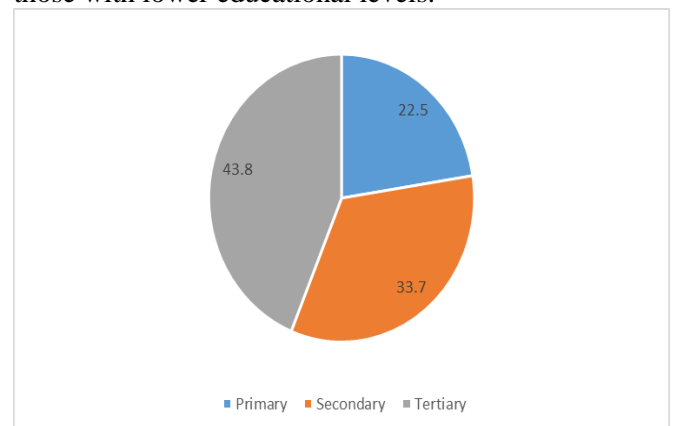


Figure 4: Percentage Distribution of Mother's/Caregiver's Educational Level as it relate to child's Immunization

Discussion

It can be seen from the data that differences in vaccination coverage still exist between northern and southern parts of the country as previously reported by Ophori *et al.* (2014). They attributed it solely to immunization service barriers and general perception about immunization. This was what led Adedokun *et al.* (2017) to conclude that any intervention being considered to improve child immunization uptake, should take into consideration these contextual characteristics. Weak supply chain management, poor access to health services and poor service provider performance were other areas that had contributed to suboptimal performance of vaccine programmes in the two regions (Gram *et al.*, 2014). Nigeria's poor

child health indices being reportedly particularly from the northern part of the country, could be partly associated with the low immunization coverage in the region.

Gender (34% and 35% vaccination coverage for male and female respectively) from the survey data was seen not to have played any critical role in determining children's vaccination status as in other studies (Subhani *et al.*, 2015). Antai, (2012) observed that the likelihood of a child receiving full childhood immunization was higher amongst female children than in males. In another study, it has been observed that male heads were less conscious to vaccinate their children than the female heads (Subhani *et al.*, 2015). It can be seen from the survey data that, no special regard is given to either male or female child in regard to immunization services.

Higher number of children in the urban areas amongst the children sampled, were vaccinated than those from rural areas. This might be connected with availability and functionality of immunization points in urban areas than in rural settings in the two regions. Several studies have shown, urban infants to have more chances of being vaccinated than rural infants and those living in urban slums (Mutua *et al.*, 2011; Mathew, 2012; Abdramane *et al.*, 2015).

The survey revealed that lack of knowledge about vaccines and vaccination services was the major barrier to reaching eligible children as was similarly reported a year ago (Gunnala *et al.*, 2016) others that closely follow it include lack of time, mistrust or fears, service delivery issues and illness of the child. Lack of knowledge about immunization services have been seen to contribute greatly in increasing the number of missed opportunities for vaccinations (Sridhar *et al.*, 2014) which in some cases can be quite high (Restrepo-Méndez *et al.*, 2016). Therefore all the regions have to put workable measures in place to reduce unvaccinated children. To support countries, WHO Strategic Advisory Group of Experts on Immunization endorsed a global strategy to lessen its impact worldwide (SAGE, 2016).

Educational level of the parent or the caregiver has a vital role to play in determining if a child is vaccinated or not (Subhani *et al.*, 2015). It can be seen from the result of the study, that the higher the level of education, the higher the likelihood of the parent or the care giver to vaccinate the child under his or her care. Lack of knowledge or education about vaccines and vaccination services was the most commonly reported reason for non-vaccination (Gunnala *et al.*, 2016). Multilevel analyses of data demonstrate that a positive and significant relationship exists between the proportion of literate females in a district and a child's complete

immunization status within that district (Parashar, 2005).

Conclusion

There exists a huge gap in terms of vaccination coverage amongst the two broad regions of the country. This study has identified three key reasons namely: lack of knowledge, mistrust or fears and service delivery issues, which if properly addressed could reduce the risk of children being completely vaccinated in Nigeria. Health officials need to work jointly to improve access and utilization across all regions.

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Author contributions

Yusuf, K.M. and Nwaze, O.E. drafted the manuscript. Garba, A.B. critically revised the manuscript for important intellectual content and Shuaib, F. conceived the article design. All authors gave final approval for the version to be published, had full access to the entire text and content and take responsibility for the integrity of the data and interpretation.

Conflict of interest

We wish to declare that we have nothing to declare

References

- Abdramane, B. S., Blessing, M., Patricia, E., Bruno, L., Roch, M., Donatien, B. and Yacouba, C. (2015). Understanding Inequities in Child Vaccination Rates among the Urban Poor: Evidence from Nairobi and Ouagadougou Health and Demographic Surveillance Systems. *J Urban Health*, 92(1): 39–54.
- Adokiya, M. N., Baguune, B. and Ndago, J. A. (2017). Evaluation of immunization coverage and its associated factors among children 12–23 months of age in Techiman Municipality, Ghana, 2016. *Archives of Public Health*, 75:28
- Antai, D. (2012). Gender inequities, relationship power, and childhood immunization uptake in Nigeria: a population-based cross-sectional study. *International Journal of Infectious Diseases*, 16(2): e136-e145
- Bbaale, E. (2015). Immunization status and child survival in Uganda. *African Journal of Economic Review*, 3(1): 1–20.

- Davis, T. J., and Kalu-Nwiyu, A. (2001). Education, ethnicity, and national integration in the history of Nigeria: Continuing problems of Africa's colonial legacy. *The Journal of Negro History*, 86: 1–11.
- Endurance, A., Ophori, I., Musa, Y. T., Azuka, V. A., Rachel, O. and Precious, E. I. (2014). Current Trends of Immunization in Nigeria: Prospect and Challenges. *Trop Med Health*, 42(2): 67–75.
- Gunnala, R., Ikechukwu, U. O., Oluwasegun, J. A., Heather, M. S., Belinda, V. U., Kathleen, A. W., Alicia, R., Hashim, E.I., Chima, J. O., Mahmud, M., Patrick, N., Ndadilnasiya, E., W. and John, F. V. (2016). Routine Vaccination Coverage in Northern Nigeria: Results from 40 District-Level Cluster Surveys, 2014-2015. *PLoS One*, 11(12): e0167835.
- Lu, G., Seyi, S., Augustinus, A., Alexander, M., Maureen, O., Zelee, H., Samuel, D., Seeba, A., Seth, O. and Betty, R. K. (2014). Socio-economic determinants and inequities in coverage and timeliness of early childhood immunisation in rural Ghana. *Tropical Medicine and International Health*, 19(7):802–811
- Mathew, J. L. (2012). Inequity in childhood immunization in India: A systematic review. *Indian Pediatrics*; 49(3): 203–223
- Musa, A. K., Henry, V. D., Bárbara, P., Nuno, L. and Henrique, B. (2015). Maternal and child health interventions in Nigeria: a systematic review of published studies from 1990 to 2014. *BMC Public Health*, 15: 334.
- Mutua, M. K., Kimani-Murage, E. and Ettarh, R. R. (2011). Childhood vaccination in informal urban settlements in Nairobi, Kenya: who gets vaccinated? *BMC Public Health*, 11(1):6.
- Nath, B., Singh, J., Awasthi, S., and Kumar, V. (2007). A study on determinants of immunization coverage among 12-23 months old children in urban slums of Lucknow district, India. *Indian Journal of Medical Sciences*, 61, (11): 598-606.
- NPC, (2014). National Population Commission & ICF International. *Nigeria demographic health survey*. Abuja, Nigeria and Rockville.
- NPC, (2017). National Population Commission. Data for national planning. <http://population.gov.ng/> accessed as at 14th December 2017.
- Olorunsaiye, C. Z. and Degge, H. (2016). Variations in the Uptake of Routine Immunization in Nigeria: Examining Determinants of Inequitable Access. *Journal of Global Health Communication*, 2 (1)
- Ophori, E. A., Tula, M. Y., Azih, A. V., Okojie, R., and Ikpo, P. E. (2014). Current trends of immunization in Nigeria: Prospects and challenges. *Tropical Medicine and Health*, 42(2): 67–75.
- Parashar, S. (2005). Moving beyond the mother-child dyad: Women's education, child immunization, and the importance of context in rural India. *Social Science & Medicine*, 61(5): 989-1000
- Restrepo-Méndez, M. C., Barros, A. J. and Wong, K. L. (2016). Missed opportunities in full immunization coverage: findings from low-and lower-middle-income countries. *Global health action*, 2016; 9.
- SAGE, Meeting of the Strategic Advisory Group of Experts on immunization, April 2016–conclusions and recommendations. *Weekly Epidemiological Record*, 91:265-84.
- Singh, P.K. (2013). Trends in Child Immunization across Geographical Regions in India: Focus on Urban-Rural and Gender Differentials. *PLoS ONE*, 8(9): e73102.
- Sridhar, S., Maleq, N., Guillermet, E., Colombini, A. and Gessner, B. D. (2014). A systematic literature review of missed opportunities for immunization in low-and middle-income countries. *Vaccine*, 32:6870-9.
- Subhani, S., Yaseen, R., Khan, M. A., Ghulam, J. and Rida, F. (2015). Impact of Mother's Education on Child Immunization: A Comparative Study of India and Pakistan. *Journal of Finance and Economics*, 3(3): 51-54.
- Sulaimon, T. A., Olalekan, A. U., Victor, T. A. and Charles, S. W. (2017). Incomplete childhood immunization in Nigeria: a multilevel analysis of individual and contextual factors. *BMC Public Health* *BMC*, 17: 236
- UNICEF, (2015). The state of the world's children 2015: Reimagine the future: Innovation for every child. New York, NY: <http://sowc2015.unicef.org>.
- WHO and UNICEF (2005). Global immunization vision and strategy 2006–2015. Geneva, Switzerland: World Health Organization; http://www.who.int/vaccines-documents/docspdf05/givs_final_en.pdf
- WHO, (2012). Millennium development goals: Immunization's contribution to reaching the Millennium Development Goal on child survival. *World Health Organization, Geneva*.